

Amendments to the Claims

The following Listing of Claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (canceled)

Claim 2 (currently amended): A system for reconstructing a high resolution image from at least one image sequence of temporally related high and low resolution image frames, each of said high resolution image frames including a low spatial frequency component and a high spatial frequency component, said system comprising:

a tangible memory storing instructions; and

a processor coupled to the memory, operable to execute the instructions, and based at least in part on the execution of the instructions operable to perform operations comprising

~~a first spatial interpolator adapted to generate~~generating a low spatial frequency component from a low resolution image frame of said at least one image sequence;

~~a high spatial frequency component generator for~~generating a high spatial frequency component from at least one high resolution image frame of said at least one image sequence, said at least one high resolution image frame being closely related to said low resolution image frame;

~~a remapper for~~mapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame;

~~an adder for~~adding said motion-compensated high spatial frequency component estimate of said low resolution image frame to said generated low spatial frequency component of said low resolution image frame to form a reconstructed high resolution image of said low resolution image frame; and

~~a controller that controls~~controlling relative contributions of said motion-compensated high spatial frequency component estimate of said low

resolution image frame and said generated low spatial frequency component of said low resolution image frame in the reconstructed high resolution image of said low resolution image frame based on measures of confidence in motion estimates used to map said high spatial frequency component to the motion-compensated high spatial frequency component estimate of said low resolution image frame.

Claim 3 (currently amended): The high resolution image reconstruction system of claim 2, wherein said first spatial interpolator upsamples in the generating of the low spatial frequency component the processor performs operations comprising upsampling the low resolution image frame in accordance with a bicubic upsampling algorithm.

Claim 4 (currently amended): The high resolution image reconstruction system of claim 2, wherein in the generating of the low spatial frequency component the processor performs operations comprising upsampling said first spatial interpolator upsamples the low resolution image frame in accordance with a bilinear upsampling algorithm.

Claim 5 (currently amended): The high resolution image reconstruction system of claim 2, wherein in the generating of the low spatial frequency component the processor performs operations comprising upsampling said first spatial interpolator upsamples the low resolution image frame in accordance with a least squares error minimization algorithm.

Claim 6 (currently amended): The high resolution image reconstruction system of claim 2, wherein in the generating of the high spatial frequency component the processor performs operations comprising said high spatial frequency component generator includes a down sampler for downsampling at least one high resolution image frame of said at least one image sequence.

Claim 7 (currently amended): A system for reconstructing a high resolution image from at least one image sequence of temporally related high and low resolution image frames, each of said high resolution image frames including a low spatial frequency component and a high spatial frequency component, said system comprising:

a tangible memory storing instructions; and
a processor coupled to the memory, operable to execute the instructions, and based at
least in part on the execution of the instructions operable to perform operations comprising
a first spatial interpolator adapted to generategenerating a low spatial
frequency component from a low resolution image frame of said at
least one image sequence;
a high spatial frequency component generator for generating a high spatial
frequency component from at least one high resolution image frame of
said at least one image sequence, said at least one high resolution
image frame being closely related to said low resolution image frame,
wherein in the generating of the high spatial frequency component the
processor performs operations comprising said high spatial frequency
component generator, wherein said high spatial frequency component
generator includes a downampler for downsampling at least one high
resolution image frame of said at least one image sequence and a
subpixel motion processor for generating a motion vector field and a
confidence scalar field from said downsampled high resolution image
frame and said low resolution image frame of said at least one image
sequence;
a remapper for mapping said high spatial frequency component to a motion-
compensated high spatial frequency component estimate of said low
resolution image frame; and
an adder for adding said motion-compensated high spatial frequency
component estimate of said low resolution image frame to said
generated low spatial frequency component of said low resolution
image frame to form a reconstructed high resolution image of said low
resolution image frame.

Claim 8 (currently amended): The high resolution image reconstruction system of
claim 7, wherein in the generating of the high spatial frequency component the processor
performs operations comprising generating said high spatial frequency component generator

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~~further includes a second spatial interpolator adapted to generate a low spatial frequency component from said downsampled high resolution image frame.~~

Claim 9 (currently amended): The high resolution image reconstruction system of claim 8, wherein in the generating of the high spatial frequency component the processor performs operations comprising said high spatial frequency component generator further includes a subtractor for subtracting said generated low spatial frequency component from said at least one high resolution image frame of said at least one image sequence to obtain a high spatial frequency component of said at least one high resolution image frame of said at least one image sequence.

Claim 10 (canceled)

Claim 11 (currently amended): A method of reconstructing a high-resolution image from at least one image sequence of temporally related high and low resolution image frames, each of said high-resolution image frames including a low spatial frequency component and a high spatial frequency component, the method comprising operating a processor to perform operations comprising:

spatially interpolating to generate a low spatial frequency component from a low-resolution image frame of said at least one image sequence;

generating a high spatial frequency component from at least one high resolution image frame of said at least one image sequence, said at least one high resolution image frame being closely related to said low resolution image frame;

remapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame;

adding said motion-compensated high spatial frequency component estimate of said low resolution image frame to said generated low spatial frequency component of said low resolution image frame to form a reconstructed high resolution image of said low resolution image frame; and

controlling relative contributions of said motion-compensated high spatial frequency component estimate of said low resolution image frame and said generated low spatial frequency component of said low resolution image frame in the reconstructed high resolution

image of said low resolution image frame based on measures of confidence in motion estimates used to map said high spatial frequency component to the motion-compensated high spatial frequency component estimate of said low resolution image frame.

Claim 12 (previously presented): The method of claim 11, wherein said spatially interpolating is performed by bicubic upsampling.

Claim 13 (previously presented): The method of claim 11, wherein said spatially interpolating is performed by bilinear upsampling algorithm.

Claim 14 (previously presented): The method of claim 11, wherein said spatially interpolating is performed by utilizes a least squares error minimization algorithm.

Claim 15 (previously presented): The method of claim 11, wherein said high spatial frequency component generating further comprises downsampling at least one high resolution image frame of said at least one image sequence.

Claim 16 (currently amended): A method of reconstructing a high-resolution image from at least one image sequence of temporally related high and low resolution image frames, each of said high-resolution image frames including a low spatial frequency component and a high spatial frequency component, the method comprising operating a processor to perform operations comprising:

spatially interpolating to generate a low spatial frequency component from a low-resolution image frame of said at least one image sequence;

generating a high spatial frequency component from at least one high resolution image frame of said at least one image sequence, said at least one high resolution image frame being closely related to said low resolution image frame, wherein said high spatial frequency component generating further comprises downsampling at least one high resolution image frame of said at least one image sequence and subpixel motion processing for the purpose of generating a motion vector field and a confidence scalar field from said downsampled high resolution image frame and said low resolution image frame of said at least one image sequence;

remapping said high spatial frequency component to a motion-compensated high spatial frequency component estimate of said low resolution image frame; and

adding said motion-compensated high spatial frequency component estimate of said low resolution image frame to said generated low spatial frequency component of said low resolution image frame to form a reconstructed high resolution image of said low resolution image frame.

Claim 17 (currently amended): The method of claim 16, wherein the generating of said high spatial frequency component generating-further comprises spatially interpolating to generate a low spatial frequency component from said downsampled high-resolution image frame.

Claim 18 (currently amended): The method of claim 17, wherein the generating of said high spatial frequency component generating-further comprises subtracting said generated low spatial frequency component from said at least one high resolution image frame of said at least one image sequence to obtain a high spatial frequency component of said at least one high resolution image frame of said at least one image sequence.

Claim 19 (canceled)

Claim 20 (currently amended): A system for reconstructing a high resolution image from a mixed spatial resolution image sequence comprising temporally spaced-apart image frames having different respective spatial resolutions, the system comprising:

a tangible memory storing instructions; and
a processor coupled to the memory, operable to execute the instructions, and based at
least in part on the execution of the instructions operable to perform operations comprising
a first frequency component generator that generatesgenerating a first spatial
frequency component from a first image frame selected from the image
sequence, the first image frame having a first spatial resolution;
a second frequency component generator that generatesgenerating a second
spatial frequency component from a second image frame selected from

the image sequence, the second image frame having a second spatial resolution higher than the first spatial resolution;

~~a remapper that spatially aligns~~ aligning the first and second spatial frequency components based on estimates of motion between the first and second image frames; and

~~a combiner that produces~~ producing a high resolution image of the first image frame from a combination of the spatially aligned first and second spatial frequency components, wherein the combiner produces the high resolution image of the first image frame from the spatially aligned first and second spatial frequency components with relative contributions controlled by measures of confidence in motion estimates used to spatially align the first and second spatial frequency components.

Claim 21 (currently amended): The system of claim 20, wherein ~~the combiner produces~~ in the producing the processor performs operations comprising the high resolution image of the first image frame with relative contributions from the second frequency component that increase with increasing measures of confidence in the associated motion estimates.

Claim 22 (currently amended): A method of reconstructing a high resolution image from a mixed spatial resolution image sequence comprising temporally spaced-apart image frames having different respective spatial resolutions, the method comprising operating a processor to perform operations comprising:

generating a first spatial frequency component from a first image frame selected from the image sequence, the first image frame having a first spatial resolution;

generating a second spatial frequency component from a second image frame selected from the image sequence, the second image frame having a second spatial resolution higher than the first spatial resolution;

spatially aligning the first and second spatial frequency components based on estimates of motion between the first and second image frames; and

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producing a high resolution image of the first image frame from a combination of the spatially aligned first and second spatial frequency components, wherein the producing comprises combining the spatially aligned first and second spatial frequency components based on measures of confidence in the estimates of motion.